

Interdisciplinary Instrumentation Colloquium

High Precision Design and Manufacture of Microfluidic Biomedical Devices

Speaker: Christine Trinkle
UC Berkeley Mechanical Engineering

Date: Tuesday, April 10, 2007
Time: 4:00 PM (sharp)
Place: LBNL, Building 50 Auditorium

Adaptation of silicon microfabrication and MEMS technology has enabled researchers to create networks of microfluidic channels on enclosed chips, allowing observation of cells and manipulation of fluidic samples possible in increasingly smaller volumes. By using this platform, researchers hope to create miniaturized, portable versions of many biological, chemical, and medical tests currently performed in wet labs. While individual components have been demonstrated, repeatability and system integration have yet to be addressed; new components and manufacturing techniques—such as polymer-based fluidic channels and surface patterning of proteins—expand the range of microfluidic devices that can be created, but also add a significant source of manufacturing and assembly error.

This seminar will discuss the use of precision machine design techniques to create high precision integrated microfluidic systems. Specifically, a method of creating microprinted arrays of viable proteins for use in microfluidics will be presented. This novel technique can produce multiple protein patterns with alignment accuracy more than an order of magnitude better than previous technology. In addition, this design provides a tool for integrating soft-polymer microfluidic channels into traditional silicon-based platforms with very high accuracy. The combination of these two procedures can significantly improve the repeatability of integrated microfluidic devices, a vital step in incorporation of these devices into biological, pharmaceutical, and medical settings. A discussion of future work will also be presented, including applications of this technology towards specific medical diagnostic systems and biomimetic ex-vivo cell study.

Please direct questions regarding site access to:

Cynthia Jones CMJones@lbl.gov Tel. 510-486-4200

Sharon Hernandez SLBHernandez@lbl.gov Tel. 510-486-4200